

REMARKS

By the above actions, the specification and claims 1-3 have been amended. Additionally, appended to this response is a copy of a translation of the MagnetoPuls® brochure referenced in paragraph [0006] of this application, the German language brochure already being of record having been submitted in an Information Disclosure Statement and having been indicated to have been considered by the Examiner. In view of these actions and the following remarks, reconsideration of this application is hereby requested.

Claims 1-3 stand rejected under 35 U.S.C. § 112, first paragraph as failing to meet the written description requirement. This rejection is inappropriate for the following reasons.

Firstly, paragraph [0006] of the disclosure as original filed states that the magnetic forming technology used in accordance with present invention may be "'MagnetoPuls' from Magnet-Physik Dr. Steingroever GmbH of Cologne, Germany." As can be learned from the appended translation of the previously submitted 1997 MagnetoPuls® brochure 1846/97, at the time of the present invention, it was known that magnetic forming technology produces no surface damage, e.g., no scuffing (see, pages 3 & 10 of the translation), and since no soldering or welding is required (see, pages 3 & 12 of the translation), the parts are not subjected to the thermal effects of such process, which is a reason why a "finished product" results (see, pages 3 & 12 of the translation) and "no pretreatment and no subsequent treatment are necessary (see, page 10 of the translation). Furthermore, the Examiner's attention is also directed to the previously submitted 1964 Metalworking Production article which notes that "advantages are evident as jointing is completed when the metal is cold," i.e., no thermal treatment effects are produced as is the case, for example, with welding.

Thus, one of ordinary skill in the art reading the original disclosure and its reference to the MagnetoPuls® magnetic forming technology would have been made aware of the characteristics that the present applicant's product would obtain as a result of the use of this known process as well as the known advantages referred to in the Metalworking Production article. As noted in MPEP § 2163.07(a):

By disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may later be amended to recite the function, theory or advantage without introducing

prohibited new matter. *In re Reynolds*, 443 F.2d 384, 170 USPQ 94 (CCPA 1971); *In re Smythe*, 480 F. 2d 1376, 178 USPQ 279 (CCPA 1973).

Furthermore, "The subject matter of the claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement." (MPEP § 2163.02) and it is well established patent law that "35 USC § 112 does not require a specific teaching of that which is already known to one of ordinary," *Case v. CPC International, Inc.*, 221 USPQ 196, 201 (Fed. Cir. 1984). To facilitate recognition of that which was already known, paragraph [0006] has been amended to reflect that which was known about the referenced prior art technique. Likewise, to make it clear that what is being claimed as a characteristic of the product is inherent in what was contained in the original disclosure, the language found not to be adequately described has been changed to more closely relate to what is now expressly recited in paragraph [0006] and was known to be attributes of products produced with the referenced prior art technique, i.e., that they are "free of surface damage and thermal effects of being heated during attachment."

Given the foregoing and the fact noted in MPEP § 2163.04 that:

The examiner has the initial burden of presenting evidence or reasoning to explain why persons skilled in the art would not recognize in the original disclosure a description of the invention defined by the claims. See *Wertheim*, 541 F.2d at 263, 191 USPQ at 97 ("[T]he PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims.")

and the Examiner has not met this burden, no evidence or reasoning having been presented to support his conclusion, this rejection should be removed and such action is requested.

Claims 1 & 2 has again been rejected under 35 U.S.C. § 103 based on the disclosure of the Bailey patent with reliance upon MPEP § 2113 and the case of *In re Thorpe* with regard to the treatment of product-by-process claims as justification for not giving weight to the recitation concerning attachment by a magnetic deformation process. This rejection and the reference to product-by-process claims are still considered to both be inappropriate for the following reasons.

As note in applicant's preceding response, neither claim 1 nor claim 2 can properly be consider a product-by-process claim as that term is normally used, and moreover, the more relevant case and comments contained in MPEP § 2113 state:

The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. See, e.g., *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 221, 223 (CCPA 1979) (holding "interbonded by interfusion" to limit structure of the claimed composite and noting that terms such as "welded," "intermixed," "ground in place," "press fitted," and "etched" are capable of construction as structural limitations.) [Emphasis added.]

In the same manner that cited case held that terms such as 'welded,' 'intermixed,' 'ground in place,' 'press fitted,' and 'etched' are capable of construction as structural limitations," it is submitted that "magnetic formation" similarly defines structural limitations that should be considered in assessing the patentability of the present claims, i.e., that the product will be free of surface damage and the thermal effects of being heated during attachment.

Also relevant to the weight that should be given to process steps in product claims is the case of *In re Hallman*, 210 USPQ 609, 611 (CCPA 1981) in which it was held that:

Product claims may be drafted to include process steps to wholly or partially define the claimed product. In *e Luck*, 476 F.2d. 650, 177 USPQ 523 (CCPA 1973). To the extent that the process limitation distinguish the *products* over the prior art, they must be given the same consideration as traditional product characteristics. (Emphasis in original).

In the present case, the process limitation does distinguish the present invention from the prior art because, in Bailey's glow plug, the "undulated compliant sleeve 46 is brazed at its first alternate and second alternate undulations 48, 49 between the surface ignition element first end portion 32 and the body second end portion 28" (column 6, lines 51-55) and such a method of connection inherently results in the parts being thermally treated in the area at which the brazing is performed. In contrast, when parts are joined by magnetic deformation, no thermal treatment effects result since as noted above, the parts are cold during magnetic deformation. Furthermore, with brazing, the elements are merely joined at the bonding points so that the connection that results is resilient from bonding only the peaks of a undulated compliant sleeve, while the plastic deformation produced by a magnetic deforming process is rigid without the resiliency that is deliberately sought by Bailey since joining occurs along the entire interface of the parts.

These noted physical differences that inherently results from the difference between the manner in which applicant forms his attachments and the manner in which Bailey produces his, are clearly reflected in the amended language of the claims which indicate that the product is "in a plastically deformed state which is free of surface damage and thermal effects of being heated during attachment." For the above reasons and in view of the amended claim language, it is submitted that the subject matter of the claims cannot properly be considered to have been rendered obvious by the disclosure of the Bailey patent, so that withdrawal of the rejection based on the Bailey patent is in order and is now requested.

Claim 3 was also again rejected under 35 U.S.C. § 103 based on the disclosure of the Hausner et al. patent. All of the comments and citations relative to the weight which must be given to the magnetic forming recitation of the present claims applies to this rejection as well. Thus, in a similar manner, the magnetic forming recitation of the present claims also structurally distinguishes the present invention from that of the Hausner et al. patent.

In particular, as also indicated in applicant's preceding response, the Hausner et al. patent discloses that its parts are joined by a press fit type connection (paragraph spanning columns 1 & 2). A press fit connection inherently results in at least one of the parts that are so joined being scuffed, scuffing damages the corrosion protection of the joined parts (e.g., the force of being joined together would damage the coating applied to the plug body). In contrast, magnetic forming produces "a noncontact deformation of workpieces" (appended translation, page 2) provides a uniformly rigid attachment over the entire area of the joint without any surface damage, as noted above.

Thus, in view of the amended claim language, it is submitted that the claims structurally distinguish their subject matter from that of the Hausner et al. patent and that the claims cannot properly be considered to have been rendered obvious by the disclosure of the Hausner et al. patent, so that withdrawal of the § 103 rejection based thereon is in order and is now requested.

With regard to the Steingroever patent previously submitted by applicant in the same Information Disclosure Statement as the MagnetoPuls® brochure and also indicated to have been considered by the Examiner, it is noted that this patent is assigned to the company that makes MagnetoPuls® and it is believed to be the patent referred to by the "Patent Granted" statement on the front of the brochure. Like the disclosure of the MagnetoPuls® brochure,

the patent to Steingroever contains no suggestion to use magnetic deformation for the production of glow plugs or spark plugs; see the description of the applicability of the process at lines 13-18 of column 2, lines 45-51 of column 3 and lines 32-38 of column 4.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with applicant's representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Lastly, it is noted that a separate Extension of Time Petition accompanies this response along with payment of the requisite extension of time fee. However, should that petition become separated from this Amendment, then this Amendment should be construed as containing such a petition and the required payment applied to Deposit Account No. 192380 (740124-183).

Respectfully submitted,

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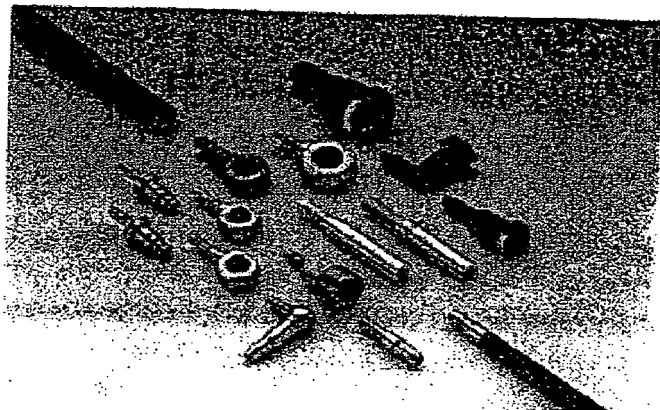
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MAGNET-PHYSIK



MAGNETOPULS®

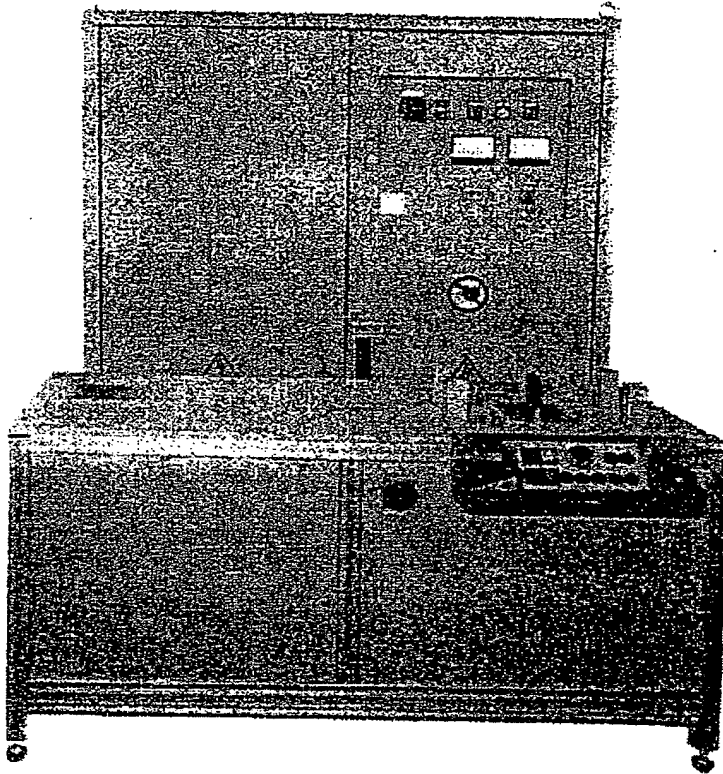


NON-CONTACT PIPES

- Shrinking
- Deformation
- Mounting Fittings
- NE-Metal/Steel/Plastic
- Joining
- Crimping

Patent granted or industrial property rights applied for

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Description

The **MAGNETOPULS®** device that we newly developed makes possible a non-contact deformation of workpieces, primarily those of cylindrical shape that are connected to one another. The connection is resistant to high pressure.

The non-contact deformation can be used primarily in pipes and rings that consist of mechanically deformable materials such as, e.g., copper, aluminum, and light-metal alloys. Examples of non-contact deformation of various components and designs can be seen in the brochure.

The coatings of the parts that are to be deformed are not damaged by the deforming process. Altogether, this results in a gentle product treatment as well as in an environmentally-friendly sequence of steps.

Result: No **SOLDERING**, no **WELDING**, no **GLUING**, no **SCREWING** but still the connection of different parts and materials to form a finished product is possible.

MAGNET-PHYSIK Dr. Steingroever GmbH
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 E-Mail: 100555-2421@compuserve.com • E-Mail: MPS@magnet-physik.attnet.de
 Die MPS Homepage: <http://www.magnet-physik.de>

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Process

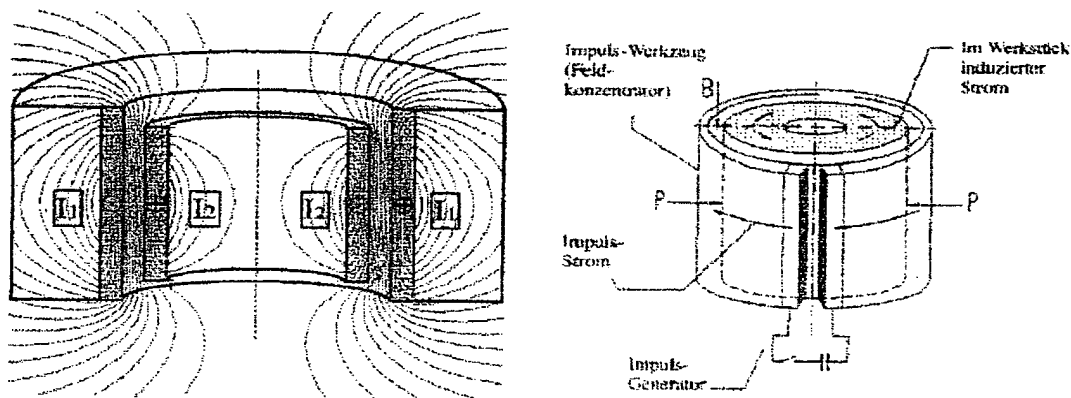
In many cases, new **MAGNETOPULS®** magnetic pulse devices make possible simple deformation of workpieces, primarily those in cylindrical shape, which are to be pressed onto another element.

The **MAGNETOPULS®** devices developed expressly for this purpose produce especially powerful current pulses up to 500 kA and quick magnetic field pulses up to 200,000 A/cm in 0.1 ms.

The deforming of, e.g., a ring that consists of metal in a magnetic field is carried out by the interaction of magnetic field B of a current I_1 with current I_2 that is induced in the ring and is proportional to product $K = B * I_2$.

The figure shows diagrammatically how the magnetic field is concentrated in the gap between the electric conductors, whereby a higher pressure develops in the inner part.

Force K can be seen graphically from the plots of the lines of the magnetic field that "squeeze" the ring.



[Key to Figure:]

Impuls-Werkzeug (Feld-Konzentrator) = Pulse Tool (Field Concentrator)

Im Werkstück induzierter Strom = Current Induced in the Workpiece

Impuls-Strom = Pulse Current

Impuls-Generator = Pulse Generator

Which Metal Parts Can be Deformed?

Primarily pipes and rings that consist of mechanically deformable workpieces, e.g., copper, aluminum and light-metal alloys, also corresponding steels and steel alloys with adequate flow behavior.

At present, tools with the following dimensions exist:

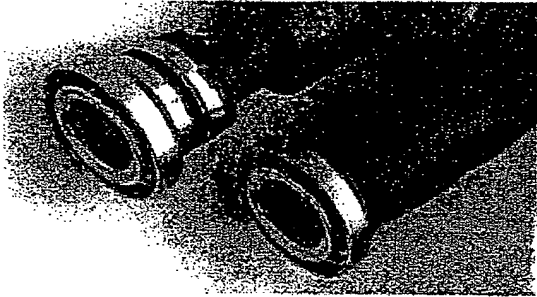
13 mm Ø x 16 mm	19 mm Ø x 16 mm
23 mm Ø x 20 mm	26 mm Ø x 16 mm
32 mm Ø x 20 mm	37 mm Ø x 33 mm
42 mm Ø x 27 mm	64 mm Ø x 16 mm

Other dimensions can be produced if desired.

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The parts that are to be deformed should pass into these tools with a small amount of play, and their diameters should be no more than 1 mm smaller than those of the tools.

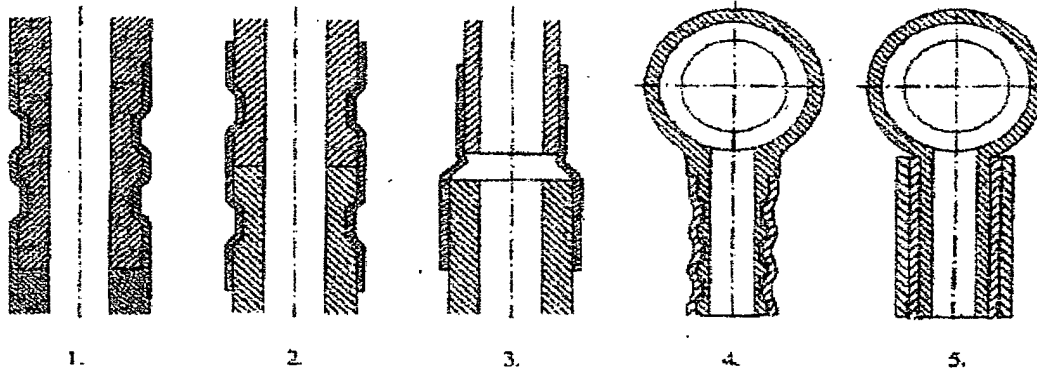
Additional Possible Applications



- ① Connection of a Fuel Tank Cap

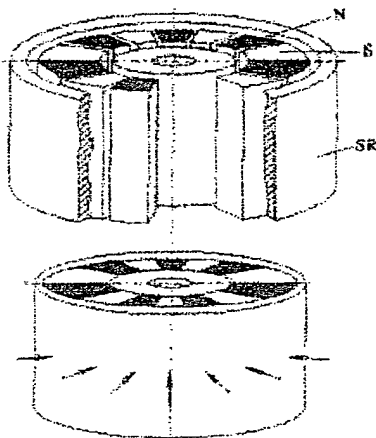
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Sample Applications



Examples of Deformation of Components by Means of MAGNETOPULS® Devices:

- 1 = Deforming connection of 2 pipes
- 2 = Deforming connection of 2 pipes by means of a collar
- 3 = Deforming connection of 2 pipes with different diameters
- 4 = Deforming connection of a pipe with a fitting
- 5 = Deforming connection of a steel pipe and a fitting with an Al collar

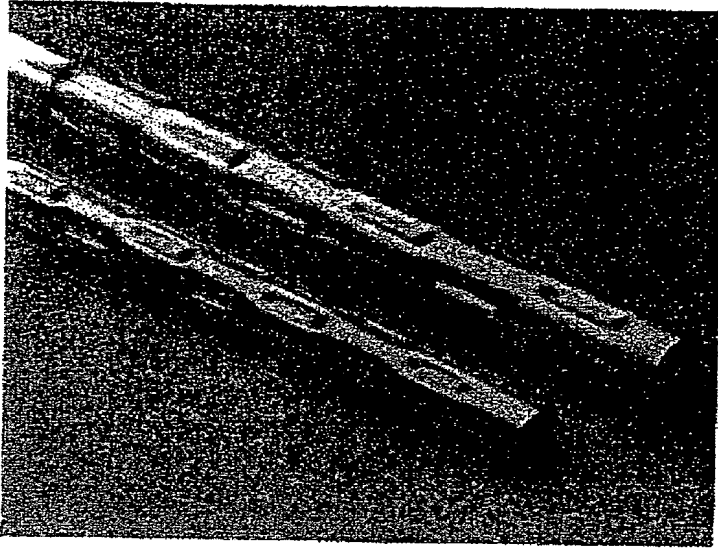


Combining the parts of a magnetic rotor with a shrink ring in the MAGNETOPULS® device.

- N, S = Permanent magnets
- Fe = Iron core
- SR = Shrink ring, light metal

The arrows show the magnetic deformation force on the shrink ring.

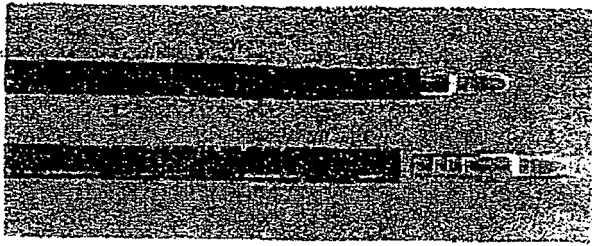
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Production of high-strength **bulging structures** in pipes that consist of Cu or Al alloys. For use as heat exchangers, liquid mixers, noise-damping devices, fluid engineering, as graceful components of lamps, etc.

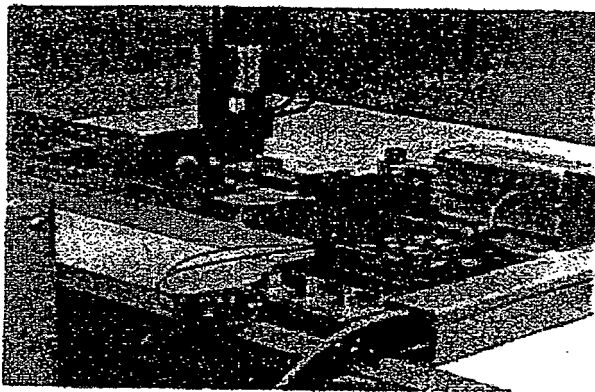


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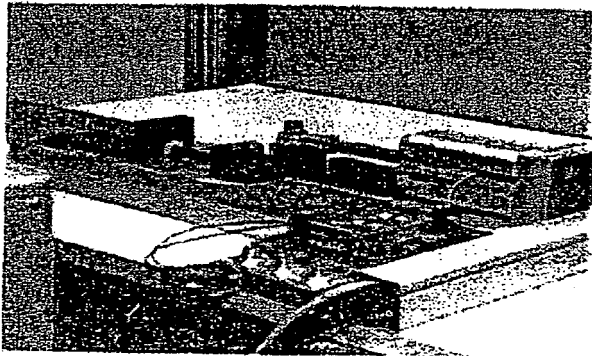


Ⓔ **HYCOT® Pipe with Fitting**

is merged with the **MAGNETOPULS®** process in a manner that is resistant to high pressure without damaging the surface in a fully automatic production path (no pretreatment and no subsequent treatment are necessary)

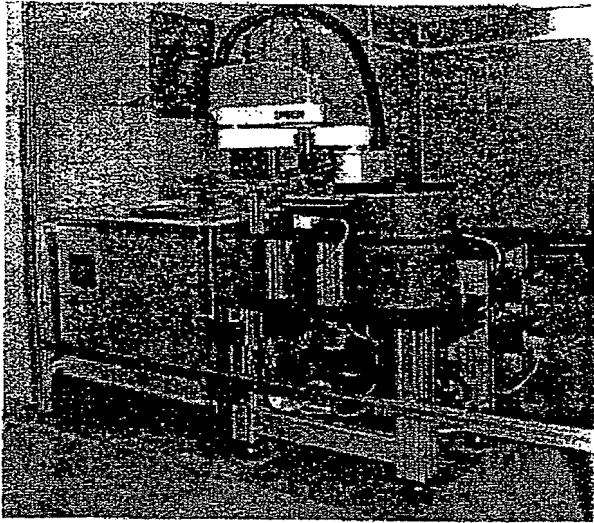


Ⓕ The gripping device inserts the pipe that is equipped with a fitting into the field concentrator.



Ⓖ Pipe equipped with a fitting is found in the field concentrator and is connected in a manner that is resistant to high pressure by means of pulse current in the ms range

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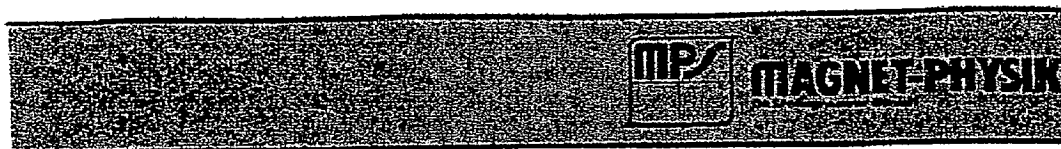


Example of a fully-automatic MAGNETOPULS® application with maximum process safety that consists of:

MAGNETOPULS® magnetic pulse device,
field concentrator, etc.,
and fully-automatic handling system.

Result: No SOLDERING, no WELDING, no GLUING, no SCREWING but still the connection of different parts and materials to form a finished product is possible.

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MAGNETOPULS®

- **NON-CONTACT SHRINKING PROCESS**
for metal parts (Cu, Al and alloys) by quick, powerful magnetic pulses
- **WITHOUT A BINDER**, solder or adhesive
- **NO PRETREATMENT**, etching, soldering material
- **NO SUBSEQUENT TREATMENT**, cleaning, neutralization, brushing, thus:
- **ENVIRONMENTALLY-FRIENDLY**
- **FAST-ACTION**: up to 500 parts/hour
- **SIMPLE AND STABLE DEVICES**, easily replaceable
- **HIGH OPERATING RELIABILITY**, by pulse-safety transformer, conforms to EC standards
- **JOINING** hard-to-solder/hard-to-weld metals
- **JOINING** metal/plastic
- **COMPOUND THAT IS RESISTANT TO HIGH PRESSURE** up to 500 bar
- **CORROSION-RESISTANT** with fittings
- **HIGHER "RETURN ON INVESTMENT"**
- **FULL AUTOMATION** possible
- High **PROCESS RELIABILITY**
- **PILOT PRODUCTION** possible

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